

Analytical evaluation of unfairness problem in wireless LANs

ABSTRACT

The number of users using wireless Local Area Network is increasing exponentially and their behavior is changing day after day. Nowadays, users of wireless LAN are using huge amount of bandwidth because of the explosive growth of some services and applications such as video sharing. This situation imposes massive pressure on the wireless LAN performance especially in term of fairness among wireless stations. The limited resources are not distributed fairly in saturated conditions. The most important resource is the access point buffer space. This importance is a result of access point being the bottleneck between two different types of networks. These two types are wired network with relatively huge bandwidth and wireless network with much smaller bandwidth. Also the unfairness problem is keep getting worse because of the greedy nature Transmission Control Protocol (TCP). In this paper, we conduct a comprehensive study on wireless LAN dynamics and proposed a new mathematical model that describes the performance and effects of its behavior. We validate the proposed model by using the simulation technique. The proposed model was able to produce very good approximation in most of the cases. It also gave us a great insight into the effective variables in the wireless LAN behavior and what are the dimensions of the unfairness problem.

Keyword: Analytical Evaluation; QoS; Fairness; Wireless LANs